

STA 4211 — Design & Analysis of Experiments

Spring 2025— MWF 3rd (9:35-10:25) – AND 0134 - Sections 14969/23302

Instructor: Dr. Larry Winner

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Office Hours: M 11:30-1:30, Tu 1:00-2:30, W: 11:00-12:30, Th 8:00-9:30

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Text: Design and Analysis of Experiments by Larry Winner (Available on Canvas)

Supplementary Text: Applied Linear Statistical Models, 5th Ed. by Kutner, Nachtsheim, Neter and Li (Chapters 15-30)

Course Description, Objectives, and Goals

This course provides an introduction to the design and analysis of statistical experiments. Experimental design techniques are used in a wide variety of academic, industrial, and scientific areas. We will cover widely used designs, and discuss practical and computational issues regarding their analysis and interpretations.

Other Materials: Datasets, assignments, and overheads available on class website and Canvas.

Web Site: UF Canvas and <http://www.stat.ufl.edu/~winner/>

Homework and Exams:

1. **Homework Assignments:** There will be 4 assignments. You will have at least one week to upload them from the time they are posted on Canvas.
2. **Exams:** There will be 3 in-class exams. For each exam, you can bring one hand-written 4x6 index card with formulas and/or notes. There will also be a Take-Home component due at the beginning of the exam.
3. **In-Class Activities:** There will be 4 In-Class Data Analysis Activities.
4. **ALC Exam:** Overall statistical assessment used to assess student learning across years.
5. **Final Project and Presentation (STA majors):** A statistical data analysis project will be prepared, along with a 10 minute in-class presentation.
6. **Grading:** Grades will be based on points from homework, exams, ACL Exam, and Final Project/Presentation. Grades are not negotiable (unless a mis-calculation is made in totaling points).
7. **Missed Exams:** Any exams that will be missed must be confirmed as soon as possible, **before** the time of the exam. Documentation must be provided. No early exams will be given under any circumstances.

8. **Late Homework:** Will not be accepted and will receive a grade of 0 unless extenuating circumstances are documented.

Prerequisites and Computing:

1. STA 4211 has a pre-requisite of STA 4210.
2. You will need a computer for homework assignments. Examples will make use of EXCEL and R; but you will need to make use of R for assignments.

Tentative Topics by Week

- Week 1: Introduction to Statistical Designs – Chapter 1 / Supplemental Notes
- Week 2: Completely Randomized (Single-Factor) Design – Chapter 2
- Week 3: Comparisons Among Treatment Means – Chapter 3
- Week 4: Alternative Tests – Chapter 4
- Week 5: Balanced 2-Factor Designs – Chapter 5
- Week 6: 2-Factor Designs with a Single Replicate per Treatment – Chapter 6, Exam 1
- Week 7: Unbalanced 2-Factor Designs – Chapter 7
- Week 8: Multi-Factor Studies – Chapter 8
- Week 9: Randomized Block, Repeated Measures and Latin Square Designs – Chapter 9
- Week 10: Random and Mixed Effects Models – Chapter 10
- Week 11: Analysis of Covariance – Chapter 12, Exam 2
- Week 12-13: Nested and Repeated Measures Designs – Chapter 11
- Week 14: Intro to Response Surface Methodology and Mixture Designs – Chapter 13, Exam 3

Tests and Grading (Any exam dates that are cancelled, exams will be on the next class date).

- Exam1 – Wednesday February 12 (In class) – 22%
- Exam2 – Wednesday March 12 (In class) – 22%
- Exam3 - Thursday May 1 (3:00PM-5:00) – 22%
- ALC Exam/Survey – Monday March 24 (In class) – 3%
- Homework – 18%
- In-Class Activities – 4%
- Final Project & Presentation 9% (Stat Majors)

R can be downloaded for free from the website:

<http://cran.r-project.org/bin/windows/base/>

Maximum Course Grade Cut-offs (Grades are not rounded to integer values):

A	A-	B+	B	B-	C+	C	C-	D	E
92	87.5	85	80	75	70	65	60	50	

Attendance/Exam/Assignment Policies: While attendance is not taken, students are expected to attend lectures and participate in class. Make-up exams will only be considered with documented medical event or conference attendance. Early exams will be given under no circumstances. Assignments are to be uploaded to Canvas on the date the assignment is due. Please turn off cell phones during classes.

Academic Accommodations:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the “Get Started With the DRC” webpage on the Disability Resource Center site. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

University Grading Points:

A	A-	B+	B	B-	C+	C	C-	D	E
4	3.67	3.33	3	2.67	2.33	2	1.67	1	0

Online Course Evaluations:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under 2 GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Policies:

Academic Dishonesty

UF students are bound by The Honor Pledge which states “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the UF Conduct Code website for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

In-Class Recording suggested wording: • Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal education use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and deliver by an instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources:

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273- 4450. •

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392- 1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.

Teaching Center: 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information.

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information

Incomplete: An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which the student has completed a major portion of the course with a passing grade, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details please visit: [CLAS incomplete grade policies and forms.](#)

Final Projects

Each student will conduct data analysis project including a written report, describing the experiment/observational study and results, as well as giving an oral presentation to the class. The data can come from one of the following methods:

- Controlled Experiment (Assign treatments to experimental units and make observations)
- Field Experiment (Make observations under various conditions in the real world)
- Data Collection from the internet (Download data and make comparisons among various individuals/teams/conditions)
- Reproduce published academic studies (Use data published or generate data that matches given summary statistics).

PLEASE DO NOT USE DATA FROM MY MISCELLANEOUS DATASETS PAGES.

Grading of Projects (Points)

Written Report:

- Complete data set included (2pts)
- Objective of study is clearly stated (2pts)
- Method of data collection describe (2pts)
- Model and assumptions clearly stated (2pts)
- Method of analysis is appropriate to the setting and objective (16pts)
- Appropriate diagnostics applied (2pts)
- Conclusions consistent with analysis (2pts)
- Project neatly typed, and graphics clearly displayed (2pts)

Oral Presentation:

- Visual displays appropriate and visible from the back of room (2pts)
- Presenter spoke with sufficient volume and eye contact with audience (2pts)
- Key features and conclusions from written report covered (6pts)